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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,786	11/03/2005	Hindrik Willem De Vries	2602-0009	1486

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EXAMINER
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BURKHART, ELIZABETH A

ART UNIT	PAPER NUMBER
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1762

MAIL DATE	DELIVERY MODE
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06/25/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/529,786	<b>Applicant(s)</b> DE VRIES ET AL.	
	<b>Examiner</b> Elizabeth Burkhart	<b>Art Unit</b> 1762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-48 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                       | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. Claims 1 and 16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites the limitation "essentially comprises..." in line 7. It is unclear whether the gaseous substance is essentially argon, nitrogen, or air or if the gaseous substance may comprise other substances. For the purposes of examination, "essentially comprises" is considered to be "comprises".

Claim 16 recites the limitation "said glass transition temperature" in line 4. There is insufficient antecedent basis for this limitation in the claim. Also, line 4-5 recites "a thermoplastic polymer film". It is unclear whether this is a different thermoplastic polymer film from the film previously described. For the purposes of examination, the recitation "a thermoplastic polymer film" is considered to be "said thermoplastic polymer film".

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
2. Claims 1-11, 14-25, 28-34, 36-43, 47, and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Vries ('632).

De Vries ('632) discloses a method for generating an atmospheric glow discharge plasma wherein a plurality of electrodes are arranged defining a discharge space and AC voltage is applied to those electrodes. A gaseous substance (nitrogen) is provided in said discharge space (Col. 3, lines 20-60) and the AC-voltage has a frequency range of 100 Hz to 300 kHz (Claim 1). The temperature of the nitrogen gas is lower than 100°C (Col. 2, line 35). The concentration of oxygen in the nitrogen/oxygen mixture is less than 24 % (Col. 3, line 35), thus the oxygen concentration is adjustable up to 24 %. Oxygen is added to the nitrogen gas in a concentration of less than 20 vol% (Table 1). The gas flows through the discharge space having a flow rate of 20 l/min (Col. 5, line 44). At least one of the electrode is covered with a dielectric film having a thickness in a range of 0.3-5 mm (300-5000 µm) (Col. 3, line 53). The distance between electrodes is 1-6 mm (1000-6000 µm) (Col. 4, line 20). De Vries ('632) also discloses an apparatus having the above features (Fig. 1).

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Regarding Claim 1, de Vries ('632) only discloses AC frequencies up to 300kHz. However, the subject matter as a whole would have been obvious to one of ordinary skill in the art at the time of invention by applicant if the overlapping portion of the AC frequency range disclosed by the reference were selected because overlapping ranges have been held to be a prima facie case of obviousness, see *In re Worthheim* 191 USPQ 90.

Regarding Claims 1-3 and 29, de Vries ('632) does not explicitly disclose applying an AC-voltage to said electrodes having an amplitude equal to at least the breakdown voltage and less than or equal to 140 % of said breakdown voltage, more preferably 110-120 % of said breakdown voltage. However, de Vries ('632) does disclose that the amplitude of the AC-voltage is 3-5 kV (Table 2) and the specification states that for nitrogen, argon, and air the desired voltages are in the range of 1-6 kV (p. 15, line 15). Thus, it would be obvious that the amplitudes taught by de Vries ('632) would be within the claimed ranges of the breakdown voltage.

Regarding Claims 16, 18, 38, and 39, de Vries ('632) does not explicitly disclose choosing a residence time or choosing the amplitude of the AC-voltage in order to keep the polymer film below its glass transition temperature. However, de Vries ('632) does disclose that the film may be moved at speeds that far exceed the speeds known in the art (Col. 2, lines 18-20), resulting in short exposure periods (residence time) to the plasma such as 0.01-10 seconds (Col. 4, lines 58-60). De Vries ('632) also discloses choosing an amplitude of the AC-voltage, wherein the amplitude is within a certain percentage of the breakdown voltage as discussed above, and that the polymer film is

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TAC, PET, or PEN (Col. 2, lines 56-60). Thus, the process conditions of de Vries ('632), being in the same ranges as the instant application, would result in the temperature of the polymer film being kept below its glass transition temperature, preventing thermal degradation of the film.

Regarding Claims 25 and 43, the specification discloses that the voltage rise time is dependent on the frequency and the amplitude of the AC-voltage and is influenced by the thickness of the dielectric material (p. 19, lines 20-24). De Vries ('632) discloses a frequency and amplitude of the AC-voltage and a thickness of the dielectric film in the claimed ranges, thus de Vries ('632) would inherently teach a voltage rise time in the claimed range.

De Vries ('632) does not disclose providing the further gas to the discharge space after stabilizing the plasma wherein the concentration of said further gas is increased stepwise and the plasma is stabilized after each stepwise increment.

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use the method of de Vries ('632) wherein the oxygen is added in stepwise increments and the plasma is stabilized after each increment because it is merely a design choice whether to add the total oxygen concentration to the nitrogen at once and stabilize the plasma or to add the oxygen concentration gradually and stabilize the plasma in steps, especially since both methods result in a plasma with good stability.

Thus, claims 1-11, 14-25, 28-34, 36-43, 47, and 48 would have been obvious within the meaning of 35 USC 103 over the teachings of de Vries ('632).

3. Claims 12, 13, 27, 35, and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Vries ('632) as applied above in view of Gherardi et al ('948).

De Vries ('632) does not disclose the gas velocity or that the plasma generated may be used for a CVD process.

Gherardi ('948) discloses a method and apparatus for generating an atmospheric glow discharge plasma wherein the gas velocity is up to 10 m/s (Col. 2, line 53) and that the surface treatment may be a CVD process to deposit a coating (Col. 7, lines 37-55).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to incorporate the gas velocity as suggested by Gherardi ('948) into the process of de Vries ('632) because it would be a suitable gas velocity for an atmospheric glow discharge plasma process involving polymer films. Also, it would have been obvious to use the plasma generated de Vries ('632) for a CVD process as evidenced by Gherardi ('948) because it is a suitable plasma to deposit a coating onto a polymer film.

Thus, claims 12, 13, 27, 35, and 46 would have been obvious within the meaning of 35 USC 103 over the combined teachings of de Vries ('632) and Gherardi ('948).

4. Claims 26 and 44 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Vries ('632) as applied above in view of Yuasa et al ('377).

De Vries ('632) does not disclose a current density through the plasma of less than 10 mA/cm<sup>2</sup>.

Yuasa ('377) discloses a current density used in a glow discharge plasma treatment process in a range of 0.2-300 mA/cm<sup>2</sup> in order to produce a uniform

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discharge plasma with desirable treatment results (Col. 5, lines 37-40). When the surface treatment is applied to a low melting point material such as polymer materials is typically in a range of 1-200 mA/cm<sup>2</sup> (Col. 6, lines 48-60).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant use the current density as suggested by Yuasa ('377) in the process of de Vries ('632) in order to maintain a uniform glow discharge plasma when treating the surface of a polymer material.

Thus, claims 26 and 44 would have been obvious within the meaning of 35 USC 103 over the combined teachings of de Vries ('632) and Yuasa ('377).

5. Claim 45 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Vries ('632) as applied above in view of Roth et al ('324).

De Vries ('632) does not disclose using a current choke coil to stabilize the plasma.

Roth ('324) discloses generating an atmospheric glow discharge plasma wherein the plasma is stabilized with a current choke coil (Col. 2, lines 51-53, Fig. 1).

It would have been obvious to one of ordinary skill in the art at the time of invention by applicant to use a current choke coil as suggested by Roth ('324) in the process of de Vries ('632) in order to create a stable and uniform atmospheric glow discharge plasma.

Thus, claim 45 would have been obvious within the meaning of 35 USC 103 over the combined teachings of de Vries ('632) and Roth ('324).




**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Burkhart whose telephone number is (571) 272-6647. The examiner can normally be reached on Monday-Thursday, 7:00 AM-5:30 PM, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

eab

  
**FRED J. PARKER**  
**PRIMARY EXAMINER**